

WHAT IS CLAIMED IS:

1. A mask pattern correction method used to form a desired pattern on a wafer by a projection optical system, comprising:

5           the step of extracting a correction target edge from a mask design pattern;

          the step of calculating the distance from the correction target edge to a nearest edge of an adjacent pattern;

10           the step of calculating the correction value according to pattern layout within a given range originated from the correction target edge by a simulation when the distance calculated in previous step is smaller than a given critical value;

15           the step of moving the correction target edge on the basis of the correction value calculated by the simulation;

          the step of calculating the moving amount of the correction target edge on the basis of an correction value set as a rule in advance when the distance calculated in previous step is not smaller than the critical value; and

20           the step of correcting the mask design pattern on the basis of the calculated moving amount.

25           2. A method according to claim 1, wherein the simulation uses a light intensity simulation technique.

          3. A method according to claim 1, wherein the

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correction value set as a rule represents as a  
parameter at least one of a size of a pattern including  
the correction target edge, a distance between the  
correction target edge and a pattern adjacent to the  
5 correction target edge, and a size of the pattern  
adjacent to the correction target edge.

4. A mask pattern correction method used to form  
a desired pattern on a wafer by a projection optical  
system, comprising:

10 the step of extracting a correction target edge  
from a design pattern;

the step of calculating a length of the extracted  
correction target edge;

15 the first step of calculating correction value  
determined one-dimensionally by pattern layout  
perpendicular to the correction target edge when the  
length of the correction target edge calculated in the  
previous step is not smaller than a predetermined  
critical length; and

20 the second step of calculating correction value  
determined two-dimensionally by pattern layout around  
the correction target edge when the length of the  
correction target edge calculated in the previous step  
is smaller than a predetermined critical length,

25 the first step including:

the distance calculation step of calculating  
a distance  $S$  from target edge to a nearest edge of

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a adjacent pattern perpendicularly;

the step of calculating the correction value by one-dimensional simulation according to pattern layout perpendicular to the correction target edge, moving the correction target edge on the basis of the calculated correction value when the calculated distance  $S$  is smaller than a predetermined critical value  $S'$ ; and

the step of moving the correction target edge on the basis of an correction value set as a rule in advance using as a parameter at least one of the distance  $S$ , a line width  $W$  of the pattern including the correction target edge, and a line width  $W'$  of a pattern including an edge adjacent to the correction target edge when the calculated distance  $S$  is not smaller than the critical value  $S'$ , and

the second step including:

the distance calculation step of calculating a distance  $s_p$  from the correction target edge to a nearest edge in the perpendicular direction, and calculating a distance  $s_h$  to a nearest edge in the direction of length;

the step of calculating the correction value by two-dimensional simulation according to pattern layout around the correction target edge, and moving the correction target edge on the basis of the calculated correction value when at least either one of the distances  $s_p$  and  $s_h$  calculated in the distance

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calculation step is smaller than a corresponding one of predetermined distances  $sp'$  and  $sh'$ ; and

the step of moving the correction target edge on the basis of an edge moving amount set as a rule in advance using as a parameter at least one of the distances  $sp$  and  $sh$ , the line width  $W$  of the pattern containing the correction target edge, and line widths  $w_p$  and  $w_h$  of patterns adjacent to the correction target edge when the calculated distance  $sp$  is not smaller than the critical distance  $sp'$ , and the calculated distance  $sh$  is not smaller than the critical distance  $sh'$ .

5. A mask pattern creation system including a mask design pattern correction method used to form a desired pattern on a wafer by a projection optical system, comprising:

a correction target edge extraction unit for extracting a pattern having a correction target edge from a design pattern;

a space width calculation unit for calculating a distance from the correction target edge to a nearest edge of an adjacent pattern;

a simulation calculation unit for calculating the correction value according to pattern layout within a given range originated from the correction target edge by a simulation in accordance with a pattern layout present within a given range determined by the

correction target edge when a space width calculated by said space width calculation unit is smaller than a predetermined critical value;

5 a rule-based moving amount calculating unit for moving the correction target edge on the basis of an correction value set as a rule in advance when the distance calculated by said distance calculation means is not smaller than the critical value; and

10 a correction unit for correcting the design pattern on the basis of the moving amount of the correction target edge calculated by said simulation moving amount calculation unit or said rule-based moving amount calculation unit.

15 6. A system according to claim 5, wherein the simulation uses a light intensity simulation technique.

20 7. A system according to claim 5, wherein the correction value set as a rule represents as a parameter at least one of a size of a pattern containing the correction target edge, a distance between the correction target edge and a pattern adjacent to the correction target edge, and a size of the pattern adjacent to the correction target edge.

25 8. A computer-readable recording medium which records a program for causing a computer to realize a mask pattern correction method used to form a desired pattern on a wafer by a projection optical system,

wherein the program causes the computer to

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realize:

a function of extracting a correction target edge from a design pattern;

5 a distance calculation function of calculating a distance from the correction target edge to a nearest edge of an adjacent pattern;

10 a moving amount calculation function of calculating an correction value by a simulation when the distance calculated by the distance calculation function is smaller than a predetermined distance;

a function of moving the correction target edge on the basis of the correction value calculated by the moving amount calculation function; and

15 a function of moving the correction target edge on the basis of an correction value set as a rule in advance when the distance calculated by the distance calculation function is not smaller than the predetermined distance.

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